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September 10, 2003

Supermassive Black Hole Sings for Its Supper

Astronomers have discovered the longest-running symphony in a cluster of galaxies more than 250 million light-years from Earth. Results from NASA's Chandra X-ray Observatory announced yesterday indicate sound waves are emanating from a supermassive black hole located at the center of the Perseus Cluster. It is impossible to hear the black hole's song, however, because its pitch is more than a million, billion times lower than the limit of human hearing.

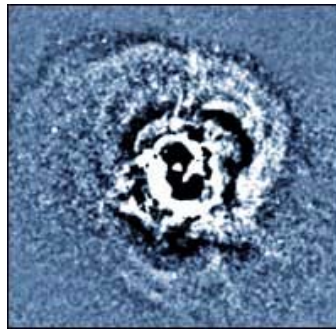


Image: NASA/CXC/IoA/A.FABIAN et al.

Previous investigations of the Perseus Cluster using Chandra determined that there are two vast, bubble-shaped cavities in the gas cluster that extend away from the central black hole. The new observations, performed by Andrew Fabian of the Institute of Astronomy in Cambridge, England and his colleagues, reveal the presence of ripples, spaced 30,000 light-years apart, that emanated from the cavities. The distance between each ripple allowed the scientists to calculate the frequency of the sound waves and the pitch, which corresponds to a B-flat 57 octaves below middle C on a piano. The black hole has been playing this "lowest note in the universe" for about 2.5 billion years, the scientists say.

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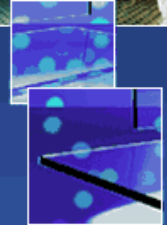
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acoustic ability of black holes may help scientists explain a conundrum of galaxy clusters: namely, why there is so much hot gas in their centers. Although astronomers expected that hot gas glowing with X-rays should cool over time--and that the dense gas located at the center of the cluster should cool the fastest--observations did not bear this out. Kim Weaver of NASA's

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Goddard Space Flight Center notes that the sound waves offer a source of heat for the central gas and could explain the paradox. "Many other clusters show the large cavities," she says, "so I'm sure people are going to start looking at them to look for sound waves." --*Sarah Graham*

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